

## Creating Self-Financing Mechanisms for MPAs: Three Cases

Marine protected area practitioners regularly face the challenge of meeting their conservation goals with a budget that is less than needed. Short on funding, MPA managers must limit their conservation programs and visitor services.

This situation is what attracts many practitioners to the concept of finding additional resources besides those budgeted. By harnessing the economic potential of an MPA — as by charging fees on visitors — they can use that revenue to support the costs of resource protection.

Around the world, MPA practitioners have instituted self-financing programs, and in many cases these programs have played an important role in supporting protected areas. Nonetheless, the art of self-financing an MPA is still very much evolving. This month, MPA News examines the different strategies that three sites — a national marine park, a private MPA, and a set of community-managed no-take areas — have taken in pursuing self-financing as a key part of their funding.

### Bonaire: Implementing a revenue generation plan

With a reputation as a scuba diving paradise, Bonaire National Marine Park (BNMP) in the Netherlands Antilles has since 1992 covered the cost of basic park operations through a fee charged to divers. Revenue from the US \$10 fee covers such expenses as management salaries, boats and vehicles, mooring maintenance, outreach materials, and law enforcement. Routinely, this has amounted to 80%-90% of BNMP's total budget; the remaining expenses — including boat purchases, research, and monitoring — have generally been covered through grants. BNMP receives no government funding.

In recent years, however, BNMP managers have felt a financial pinch, due to rising expenses and a diving fee that has remained flat. In 1998, BNMP management described the park's financial situation as "poor" and in need of changes.

Kalli De Meyer, BNMP manager for nine years before leaving late last year, says BNMP's financial challenges stem from the fact that the \$10 fee, which comfortably covered the marine park's running costs in 1992, is now too small. "Back then, the marine park consisted of a

manager and two rangers, one boat, and two vehicles," she said. "Since 1992, costs have skyrocketed; we had inflation running at 7%-10% for several years. Additionally, the marine park has grown into its task and now employs a manager, four full-time rangers and four part-time members of staff. The amount of work and the ambitious projects undertaken by the park have likewise snowballed."

De Meyer points out that the number of divers since 1992 has also increased — from 19,500 in 1992 to around 28,000 now — but the net result has still been a deficit for the park.

In response, BNMP staff crafted a program in 1998 to expand revenue generation. The program proposed the following measures, among others:

- To increase the diving fee to US \$20, OR to charge a US \$10 fee to all users of the park (the staff proposed implementation of either of these, but not both)
- To implement fees for public and private moorings in the park
- To obtain tax-exempt status in the USA for donations
- To explore possibilities for the sale of BNMP merchandise in retail outlets

Management has already applied some of these measures. In 1999, BNMP's multistakeholder management body (STINAPA, a Dutch acronym) — consisting of conservation, tourism, and island interests — approved the charging of a \$10 fee to all users of the park except for islanders, children under 12, and swimmers. (Notably this has not yet been implemented, partly due to the challenge of collecting such a fee, according to De Meyer.) STINAPA has approved the charging of mooring fees, and collection is underway. And BNMP has teamed with the Coral Reef Alliance (CORAL), a US-based NGO, to accept donations through CORAL's tax-exempt status. The sale of BNMP merchandise has not yet developed: BNMP lacks its own retail outlet, and retailers have been reluctant to share profits, said De Meyer.

Fundraising can be a frustrating and time-consuming aspect of MPA management. At the time De Meyer left BNMP, she was spending up to 15% of her time on

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## Self-financing

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finance-related issues. "But there was no other way," she said. "The alternative was to run the park at a basic maintenance level only, and I could not do that." She recommends that other managers be as creative as possible with their financing strategies and avoid placing all their "eggs in one basket."

"We should all be looking for longer term solutions to our financing woes in order to ensure a future for our marine parks," she said. "Trust funds, corporate sponsorship, who knows?"

### Chumbe Island: Riding the tourism wave

Chumbe Island Coral Park Ltd. (CHICOP) is a privately run reef- and forest-conservation project covering tiny Chumbe Island and its western fringing reef, eight miles (13 km) southwest of Zanzibar, Tanzania. The park was established in 1992 to create and manage the Chumbe Reef Sanctuary. Its reef is among the healthiest in the region, with 370 species of fish and over 200 species of scleractinian corals, 90% of all recorded in the region.

CHICOP, a small, private not-for-profit company, aims to create a model of sustainable conservation area management where ecotourism supports conservation and education. Profits from the tourism operations are to be reinvested in conservation area management and free island excursions for local schoolchildren.

Along this line, CHICOP has constructed a visitors center and seven "eco-bungalows" for visitors, in addition to establishing a ranger program and a sanctuary for an endangered species of antelope. About two-thirds of the US \$1 million start-up cost was financed privately by a benefactor, while the rest was covered through grants from various international NGOs and foreign donor organizations. Now, CHICOP receives no additional donor support and depends entirely on income from ecotourism. The CHICOP website – <http://www.chumbeisland.com> – plays a central role in attracting tourists from all over the world.

CHICOP's annual budget is roughly US \$120,000, and the park is "coming closer every year" to meeting that through tourism revenue, said Sibylle Riedmiller, CHICOP project director. When asked in early January of this year what factors could potentially threaten the park's tourism revenue stream, Riedmiller said the only one about which she was seriously concerned was political violence in the country. "Political violence can reduce tourist arrivals from a boom to a trickle within weeks," she said.

Her words were prophetic. On January 27, Zanzibari police clubbed and opened fire on unarmed supporters

of the Civic United Front, the opposition party on the semi-autonomous island. The civilians had been planning demonstrations to demand new elections. More than 40 people were killed, and sporadic violence continued well into the month of February.

With foreign governments and newspapers warning against travel to Zanzibar ("Brits Trapped in Death Riots" was one paper's headline), tourism to the area plummeted. "After making news on BBC for a couple of days, this situation resulted in immediate cancellations of bookings far into the year 2001," said Riedmiller. "For the time being, we have resumed operations on Chumbe Island, but cancellations have now reached approximately US \$32,000 worth of business lost. New bookings are very few, and will probably remain low, as long as the image of Zanzibar as a safe destination remains dented in the international tourism market."

How can MPA managers prepare for such events so that they do not threaten an MPA's long-term financial stability? Riedmiller said the first and foremost precautionary measure is to keep overhead costs down. CHICOP does this in a number of ways, including encouraging help from volunteers, keeping some staff on seasonal schedules, and outsourcing some monitoring to university students. CHICOP also markets Chumbe Island primarily on the Web, rather than through more costly "traditional" channels (e.g., magazine advertisements, tourism fairs), and has negotiated with government for reduced rates or exemptions on fees and taxes.

Ideally, said Riedmiller, she would like to see international conservation organizations set up an insurance scheme to provide parks with a financial cushion against the risk of revenues suddenly drying up. Such insurance could be provided to parks that have proven their environmental sustainability.

As for the future of Chumbe Island, it remains uncertain. "The political situation in Zanzibar has calmed down a bit over the last couple of weeks," said Riedmiller, "but the underlying problems have not been solved, nor been acknowledged by the government."

### Fiji: Bioprospecting as long-range funding source

There are other methods besides tourism that MPAs can use to generate revenue. In Fiji, one project is using bioprospecting as a way to generate cash for area communities while raising awareness of the value of local biodiversity.

Bioprospecting involves the collection and testing of biological resources for the purpose of developing new products, often medicines. In the past, some community activists and scholars have criticized bioprospecting as an inappropriate venture for local communities. Its

potential downsides include the fact that short-term financial benefits from sampling fees are not sustained for very long, and that there is typically little investment in the community in terms of infrastructure. In addition, calculating the magnitude and distribution of eventual profits can be difficult.

In 1995, the University of the South Pacific (USP — Suva, Fiji) and the World Wide Fund for Nature (WWF) sought a way to create a conservation-based

## Making Italy's MPAs Self-Financing

Nick Marchesi of Pescares Italia Srl, an Italian consulting firm, envisions a future in which all of Italy's protected areas will benefit from tourism-based revenue. In essence, he says, he'd like to see his country's protected areas managed not as "state entities" but as "nature enterprises".

"Thanks to tourism, the environmental resources available in and around protected areas become, potentially, an extremely valuable economic asset," said Marchesi. "Nevertheless, we keep managing them as inexhaustible common goods to which everybody has to be granted free and unconditioned access. Although ethically sound, this management approach is in fact undermining the enormous value of these resources, preventing us from managing them effectively."

Marchesi is proposing a pilot project to the European Union in which self-financing mechanisms would be developed and applied to two marine protected areas along the Tyrrhenian coast of Italy. Among other things, the project would involve analysis of each MPA's socioeconomic and environmental conditions, as well as economic valuation of the sites' cultural and natural assets. Marchesi's ultimate intent is to transfer the lessons learned from this pilot project to the rest of Italy and the European Union.

"First we need to show decisionmakers that self-financing works before we [apply] it nation-wide," said Marchesi. He said that Italy is still working toward the strong pro-conservation mindset that characterizes northern European countries, and has a very limited fundraising tradition for protected areas.

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enterprise that carried little financial risk for local communities. They settled on bioprospecting, and focused their work on the coastal community of Verata, which suffered from overfishing.

The USP/WWF team contracted with a UK-based pharmaceutical research firm. A key feature of the contract has been that a small amount of sample is licensed through the pharmaceutical company for a limited period, usually one year. This sample remains the property of the community and, if not under a licensing agreement, can be reclaimed by the community. Collection and processing fees come to about US \$200 per sample. Royalty fees from development of products based on the samples will be passed on to Verata.

Bill Aalbersberg, a project leader from USP, said the proceeds from the contract have totaled about US \$30,000 to date. "This will increase to about \$50,000 from the initial contract," he said. "Once the exclusivity period ends, the samples can be licensed elsewhere."

Verata has received no royalties yet. "The period to develop a medicine is at least 15 years, so it has not been long enough," said Aalbersberg. Bioprospecting requires financial patience on the part of all involved.

The conservation benefits of the project have been more immediate in coming. Involved in the project's local-level planning and sample collection, fishers have been encouraged to monitor their marine resources while generating data to assess the overall health of the nearshore marine system and fishery populations. Early on, one village established a trial *tabu* (no-take) area for comparative study with fished areas. When the *tabu* area's clam population increased 1000%, other villages followed suit. There are now nine *tabu* areas in Verata, covering multiple habitat types and indicator species.

"The community has the choice of whether these areas are opened up again or not," said Aalbersberg. "We provide information but the choice is theirs. We suspect for species-specific *tabu* areas such as the Halimeda beds for the clams that the community may decide — once their monitoring shows the increases have leveled out — to open it up and close another area."

The Verata community has set up a trust fund with the money it has received through the contract. It has invested half the money and used the rest for conservation and education purposes.

In a project paper available online (<http://www.bcnet.org/results/insearchof.htm>), the USP/WWF team points out that if bioprospecting is carried out respectfully and judiciously, the benefits can be solid and the risks minimal. "Linked to community resource management and tied into other enterprise options," say the authors, "community bioprospecting can provide an important catalyst for sustainable rural development." 

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### To learn more about how to finance your MPA:

The World Conservation Union (IUCN) has published a guidebook to help protected area managers identify and secure appropriate finance. See page 6 of this issue for more information on *Financing Protected Areas: Guidelines for Protected Area Managers*.

# Citing Benefits of No-Take Areas, Scientists Call for New Networks of Marine Reserves

There is now compelling scientific evidence that no-take areas — or marine reserves — conserve both biodiversity and fisheries, and could help replenish depleted fish stocks, according to a consensus statement signed by 160 marine-science academics from around the world. Released February 17 at the annual meeting of the American Association for the Advancement of Science (AAAS), the statement is the culmination of a three-year, international effort to advance scientific understanding of marine reserves.

“All around the world there are different experiences, but the basic message is the same: marine reserves work, and they work fast,” said Jane Lubchenco (Oregon State University, USA), a past president of AAAS and a leader of the three-year effort. “It is no longer a question of whether to set aside fully protected areas in the ocean, but where to establish them.”

The consensus statement recommends that marine resource managers use reserves as a “central management tool” for achieving long-term fishery and conservation benefits. It concludes that networks of reserves, rather than isolated single reserves, will be necessary to buffer against environmental variability and catastrophes.

## Increases in population density, biomass

The academic effort to develop a better scientific understanding of marine reserves grew out of the 1997 AAAS meeting, where scientists reviewed the state of the oceans and identified research priorities. Following that meeting, several researchers formed a team, based at the National Center for Ecological Analysis and

Synthesis (University of California, Santa Barbara), to examine the effects of reserves on fish populations.

The team’s study of more than 100 reserves from around the world indicated that after one to two years of protection, these reserves averaged a 91% increase in population density, 192% increase in biomass, and 23% increase in species diversity as compared to reference sites. The consensus statement also noted that in the few studies that have examined the effects of reserves on fish populations in adjacent waters, the size and abundance of exploited species has increased.

“The results are startling and consistent,” said Robert Warner of the University of California, Santa Barbara, a leader of the academic effort.

The consensus statement follows the release last November of another document from scientists in support of marine reserves. A committee of the US National Research Council (NRC) released a 150-page report urging marine resource managers to increase their use of marine reserves as a supplement to conventional management tools (MPA News 2:5). The report, *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems*, assessed the scientific basis of techniques for locating, designing, and implementing reserves.

Megan Dethier (University of Washington, US), who assisted with the first draft of the consensus statement, said the statement’s brevity — three pages — reflected its intended purpose. “We wanted to make a [statement] that was short and direct enough to be readily usable by the press, NGOs, etc., to help ‘spread the word’, rather than a complex scientific document that would not be ‘picked up’ in the way that this one clearly has been,” said Dethier. 

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An electronic version of the consensus statement on marine reserves is available online at the following websites:

[www.compassonline.org/frame.html](http://www.compassonline.org/frame.html)

[www.nceas.ucsb.edu/Consensus](http://www.nceas.ucsb.edu/Consensus)

## Conclusions of the Consensus Statement

- Reserves conserve both fisheries and biodiversity.
- To meet goals for fisheries and biodiversity conservation, reserves must encompass the diversity of marine habitats.
- Reserves are the best way to protect resident species and provide heritage protection to important habitats.
- Reserves must be established and operated in the context of other management tools.
- Reserves need a dedicated program to monitor and evaluate their impacts both within and outside their boundaries.
- Reserves provide a critical benchmark for the evaluation of threats to ocean communities.
- Networks of reserves will be necessary for long-term fishery and conservation benefits.
- Existing scientific information justifies the immediate application of fully protected marine reserves as a central management tool.

From “Scientific Consensus Statement on Marine Reserves and Marine Protected Areas,” released February 17 at the 2001 meeting of the American Association for the Advancement of Science (AAAS), San Francisco, California, USA. 

Editor's note: Steve Palumbi, author of the following piece, has studied the genetics, evolution, population biology, and systematics of a diverse array of marine and terrestrial organisms. His current work is on the genetics of marine populations in the context of the design and implementation of MPAs. Palumbi has been co-leader of a three-year effort to examine the effects of marine reserves on fish populations, based at the National Center for Ecological Analysis and Synthesis (see opposite page).

## MPA Perspective: Genetics, Marine Dispersal Distances, and the Design of Marine Reserve Networks

By Stephen Palumbi, Department of Organismic and Evolutionary Biology, Harvard University

The seas are increasingly in serious trouble. Coral bleaching, blankets of hypoxic or anoxic water, radical changes in species composition, toxic algal blooms, marine epidemic diseases, mass mortalities, and fisheries collapses are all symptoms of complex but fundamental alterations in the health of marine ecosystems. As both the value and vulnerability of marine ecosystems become broadly recognized, there is an increasing search for effective mechanisms to prevent or reverse widespread declines, and to sustain or restore ocean ecosystems.

Fully protected marine reserves are a powerful tool for marine conservation and management. Defined as areas in which no extractive activities are allowed, "fully protected marine reserves" are a special category of "marine protected areas" (MPAs), which are sites in which some activities are constrained.

These reserves are different than terrestrial parks because marine species are fundamentally different in how they use habitat. Because many larvae or spores of marine species disperse through the water column, populations from one generation to the next live in different places, and may move outside the boundaries of a single reserve. A confluence of recent empirical and theoretical results indicates that these species will benefit most from a network of reserves, and that such protective necklaces can accomplish both conservation and fisheries goals and provide enhanced ecosystem impact.

How should networks be designed to enhance their function, protect species and provide the most value? Although the morphology of a network of marine protected areas can be complex, there are a few key features shared by all networks that play fundamental roles in their functioning. The minimum set of network features that captures the most important functional attributes consists of:

- the span of the network (the length of coast line or area of habitat between the most distant protected units)
- the size of individual reserves
- their number
- their placement

Together these features determine other critical network features like the amount of area dedicated to protection and connectivity among units.

Other researchers (Warner 2001, Botsford 2001) have shown the critical importance of larval dispersal distance on functioning of individual reserves. Network span also requires knowledge of likely dispersal distances of larvae, juveniles, or adults. To preserve most community components, the span of a network must encompass the dispersal range of species with the greatest potential for movement. To reduce edge effects, and keep loss of individuals from the system of reserves below 10%-20%, the span of a reserve network should be 5-10 times greater than the maximum dispersal range for species to be protected by the network.

Because virtually all marine communities have a significant fraction of species with pelagic periods of 30-60 days, most marine reserve networks should be large enough to encompass the dispersal distances associated with this larval duration. As a result, determining the span of a marine reserve network should be informed by an estimate of average larval dispersal ranges for the variety of species within the communities to be protected. There are few concrete data on this topic, but useful inferences can be made from a number of studies that focus on 1) range expansion of invading species, 2) correlations of population size along a coastline, and 3) the scale of genetic differentiation in broadly distributed populations.

For example, we have recently shown (Barber *et al.* 2000) that populations of common Indonesian mantis shrimp species show extremely abrupt genetic boundaries in unexpected places. Despite very strong current flow patterns that should transport larvae long distances, genes from populations as close as 200 km show radically different sequences, indicating nearly complete lack of population exchange. Such data are in complete agreement with recent reports of high larval retention of fish larvae around coral islands (Warner 2001), and suggest strong ocean currents are not always enough to waft planktonic larvae far away.

*continued on next page*

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A summary of available data on dispersal potential shows a striking surprise: average movement of successful larvae may be 10 times lower than expected, on the order of 50-100 km for species with high potential for dispersal. Nonetheless, these figures suggest two important points. First, the waters set aside to effectively sustain these species must span 500-1000 km. Second, few single reserves will be large enough to sustain these species — they must rely on functioning networks for survival. Thus, network design will often cross political boundaries and require cooperation in areas defined not by map borders but by the ecosystems themselves. 

#### References:

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Botsford, Louis W. 2001. "Marine Reserves for Sustainable Populations in Fisheries and Conservation," presented at AAAS Session: The Scientific Theory of Marine Reserves, 17 February 2001, San Francisco, California. Abstract available online at <http://www.compassonline.org/frame.html>.

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## IUCN Offers Financing Guidebook for Managers

The World Conservation Union (IUCN) has published a guidebook to assist protected area managers in identifying and securing appropriate and sustainable finance. *Financing Protected Areas: Guidelines for Protected Area Managers* provides a step-by-step process for creating business and financial plans, and discusses mechanisms for generating revenue flows.

Released in October 2000, the 58-page book is based on inputs from a range of sources, including IUCN's Economics Unit and the IUCN World Commission on Protected Areas (WCPA). It guides readers through the range of funding sources and mechanisms available at international, national and local levels.

Lee Thomas, deputy chair of the WCPA and convenor of its task force on financing of protected areas, said that access to funds is becoming increasingly important for effective management. Learning how to access those funds is key. "The most common pitfalls for protected area managers in pursuing finance are a lack of a business plan and lack of a strategy for securing sustainable financial flows," said Thomas. "Hence our book recommends that park managers adopt both of these measures."

#### Linked to website

The book is intended to serve as a living document through the associated IUCN website of <http://biodiversityeconomics.org/finance/topics-38-00.htm>. The full text of the book is downloadable for free from that site; IUCN will update the book on the site as new material becomes available. In addition, the website

offers material not found in the book, including a list of donor organizations by global region, along with links to those donors' websites.

In terms of achieving sustainable financing, said Thomas, the approach advocated in the book is universal to both terrestrial and marine protected areas. The book, therefore, is intended for both types. "There are differences, however, when it comes to individual users," said Thomas. "In some respects, it is more difficult to collect user fees individually from users in a marine park without entry stations, compared to a terrestrial park with designated entry points.

"The challenge for the manager," he said, "is to recognize the charging opportunities available, whether for a marine or terrestrial park, and to put in place cost-effective and acceptable arrangements for their implementation." 

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The WCPA website — <http://wcpa.iucn.org> — provides additional information on the work of the WCPA Finance Task Force.

### Book available for free on the web

*Financing Protected Areas: Guidelines for Protected Area Managers* is downloadable for free on the web:

<http://wcpa.iucn.org/pubs/publications.html>  
or

<http://biodiversityeconomics.org/finance/topics-38-00.htm>